Wound Evaluation

Rose Hamm, PT, DPT, CWS

History/Subjective Exam

- Purpose
  - Obtain information to determine wound etiology
  - Determine tests and measurements needed for definitive diagnosis
  - Help determine treatment plan
- Content
  - Questions about onset
  - Pertinent medical history
  - Functional status

why does this pt have a wound? why is it not healing?

WHY???

WHY???

WHY???

Questions to ask

- When and how did the wound begin?
- Can any other precipitating event be associated with the onset of the wound?
  - A walk in bare feet
  - A fall
  - A new pair of shoes
  - An insect bite
- What treatment has been used?
- What other signs and symptoms are present?
  - Fever
  - Itching could be allergic rxn
  - Pain
- What alleviates the pain?
- Is the wound improving or regressing?

More questions…

- What other disease processes are present?
- What medications (with dosages) are being taken?
  - Prescription
  - Herbal
  - Over the counter
- Are any allergies relevant to the wound?
- What is the nutritional status? protein is important in ortho tissue healing
- What are the alcohol, tobacco, and drug habits?
- What is the physical activity level?
- What kind of assistive device is required for functional activities?
- What kind of shoes does the patient wear?

Wound description

- Dimensions
- Subcutaneous extensions
- Tissue type
- Drainage
- Periwound skin color
- Edema
- Edge description
- Odor

- Pain
- Sensation
  - Pressure
  - Light touch
  - Temperature
- Pulses

Dimensions = size

most important outcome measurement medicare/third party payers look at

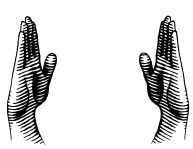
Methods

Perpendicular

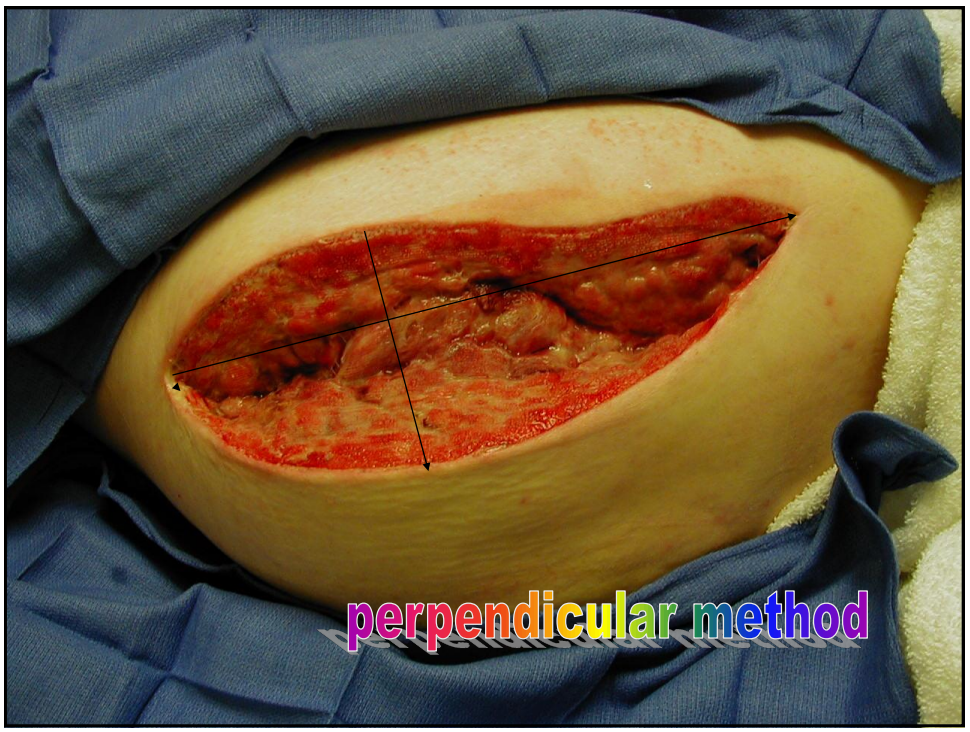
Clockwise

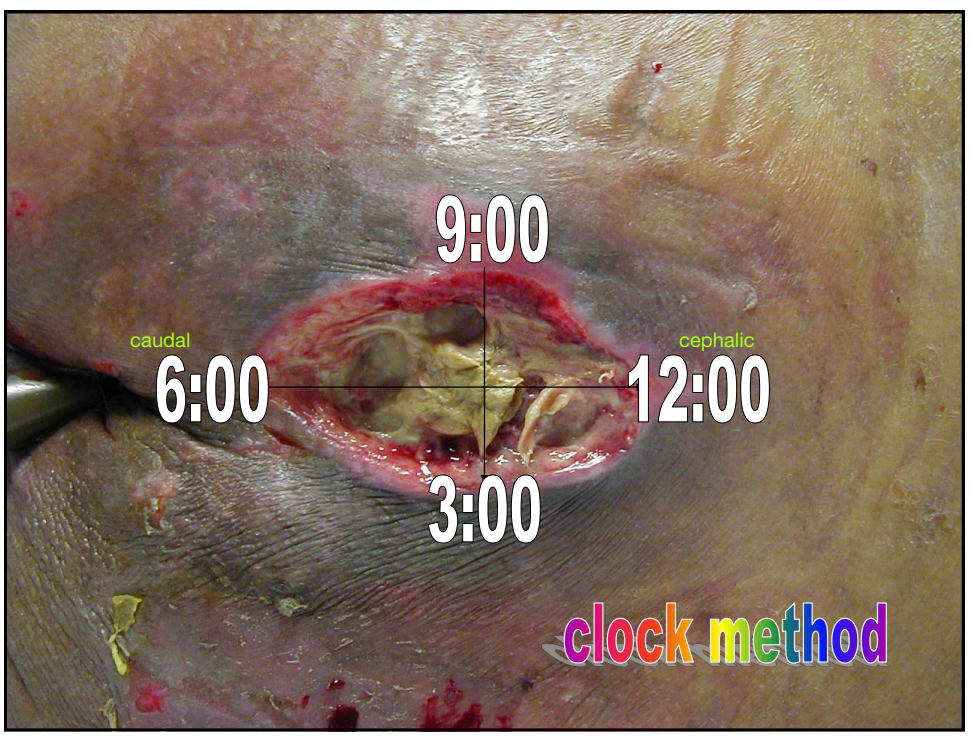
Photography

Electronic



longest length and longest width
to estimate SA
measure depth with cotton applicator





Subcutaneous extensions

- Undermining – destruction of the connective tissue between the dermis and subcutaneous tissue
- Sinus – long, narrow opening along a fascial plane
- Tunneling – a tract that connects two wounds

discoloration of skin indicates loss of subcutaneous tissue

Tissue type

- Indicates the healing phase
- Provides data for measuring outcomes
- Helps determine optimal treatment plan, especially for primary and secondary dressings
- May help indicate other disease processes

Tissue - *eschar*

dead tissue. not the same as scab

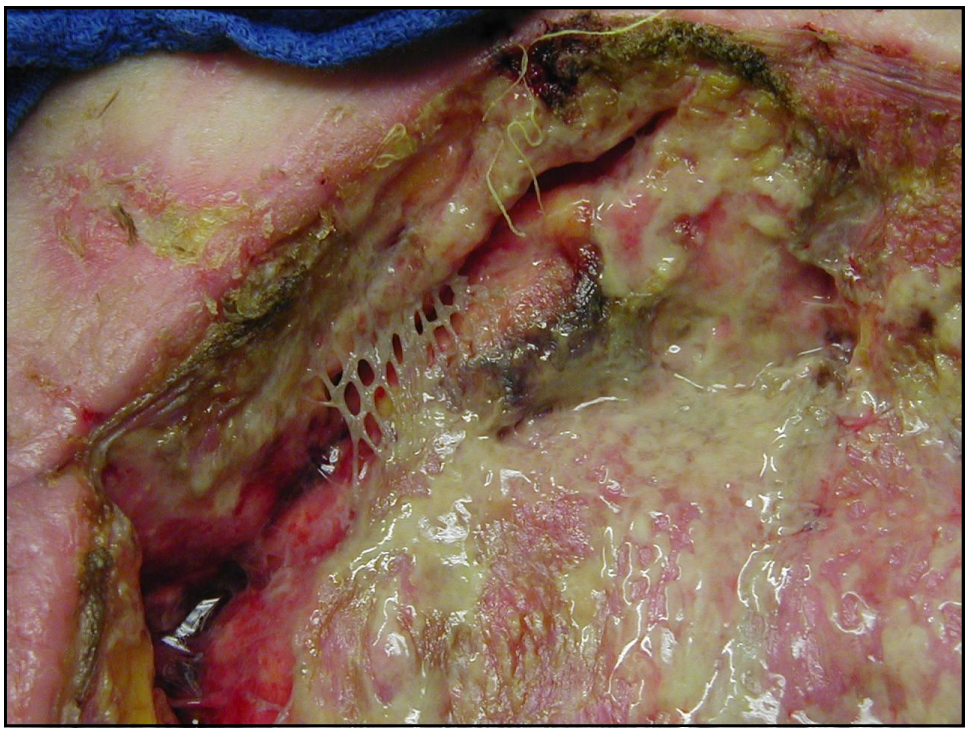
- Black, brown, yellow, or gray fibrin
- Composed of dead cells
- May be dry and hard or soft and rubbery
- May be dry gangrene or wet gangrene

Tissue – *yellow slough*

common in chronic wounds

- Is softer, lighter necrotic debris
- Is the by-product of autolysis body breaks down own dead tissue.
- Is usually seen beneath eschar
- Is more common in the inflammatory phase of healing
- Differs from adhered connective tissue in that it is soft and mushy, sometimes hard to grasp with forceps

good bc indicates healing process
but bad bc indicates presence of dead tissue

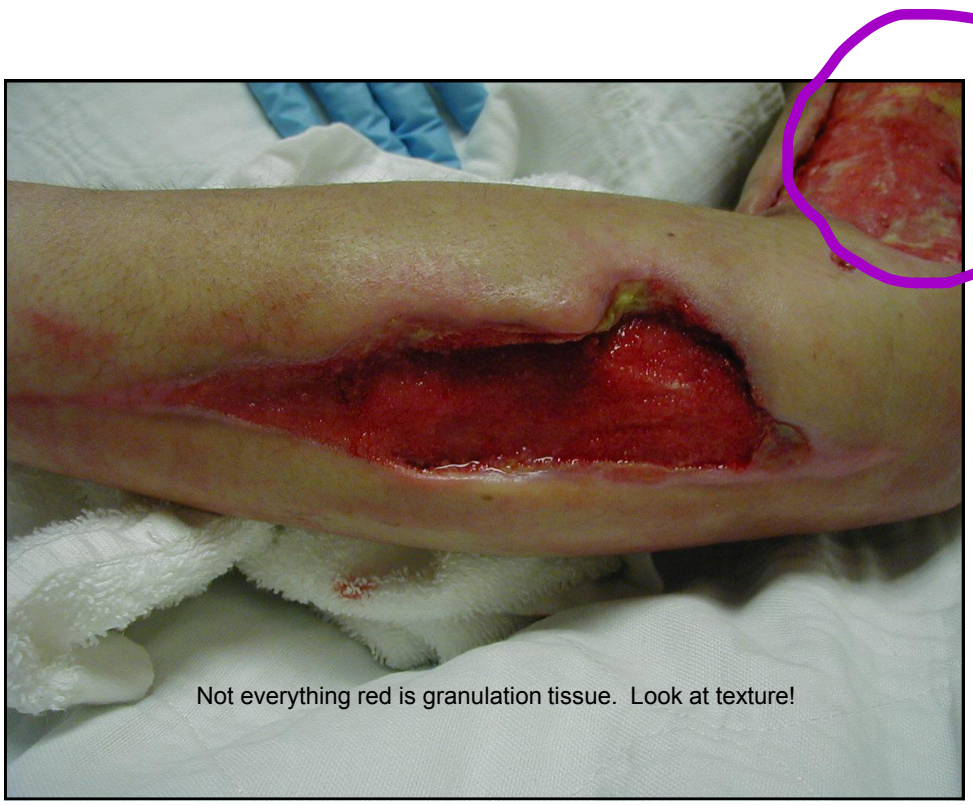


Tissue- *granulation tissue*

sign of healthy healing process
absolutely necessary for wound closure

- Is red, "beefy" looking
- Is the result of angiogenesis new formation of blood vessels
- Is composed of new capillaries and extracellular matrix
- Varies in color from anemic to bright red
- Is necessary for closure by secondary intention or for STSGs split thickness skin graft
- Is carefully protected in good wound management

Not everything red is granulation tissue!



not granulated tissue. muscle

more anemic
not as healthy

Tissue – *devitalized fascia*

- Is dull in appearance
- Composed of fibrous connective tissue
- Is typically seen around or between other tissues

Tissue - *muscle*

- Striated
- Reddish when healthy
- Brownish-gray when devitalized
- Sensate when healthy
- PAINFUL when exposed

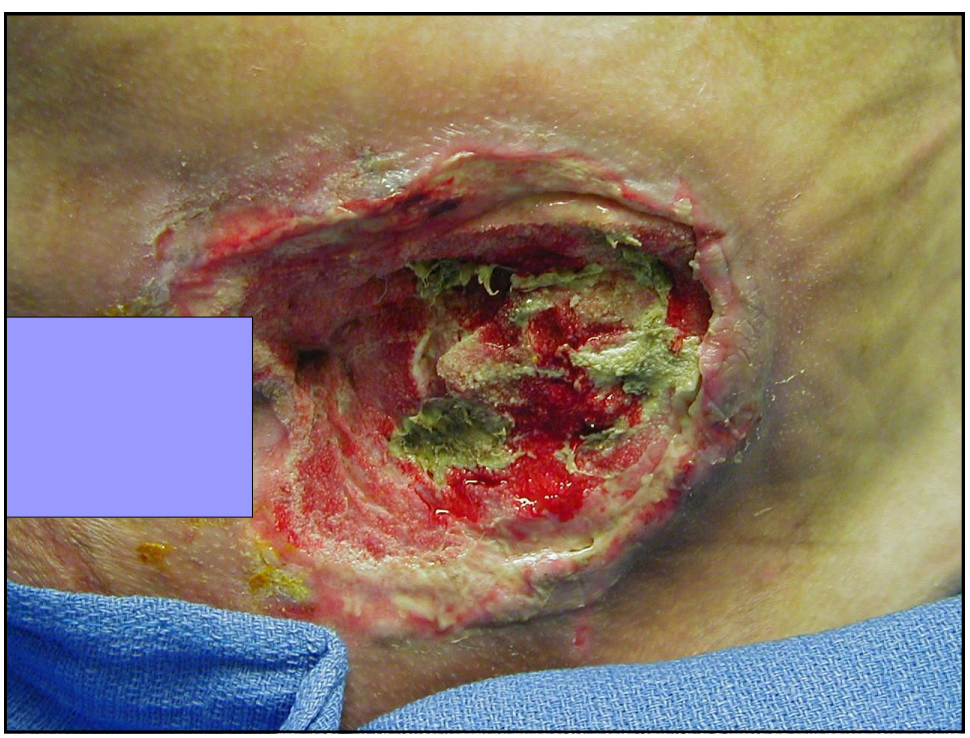
healthy muscle bleeds, twitches
necrotic muscle does NOT bleed or twitch

Tissue - *tendons*

- Are shiny and stringy when healthy
- Are covered with a fibrous sheath of connective tissue containing synovial fluid or fatty fluid (paratenon)
- Becomes dull and dry when devitalized

Tissue - *bone*

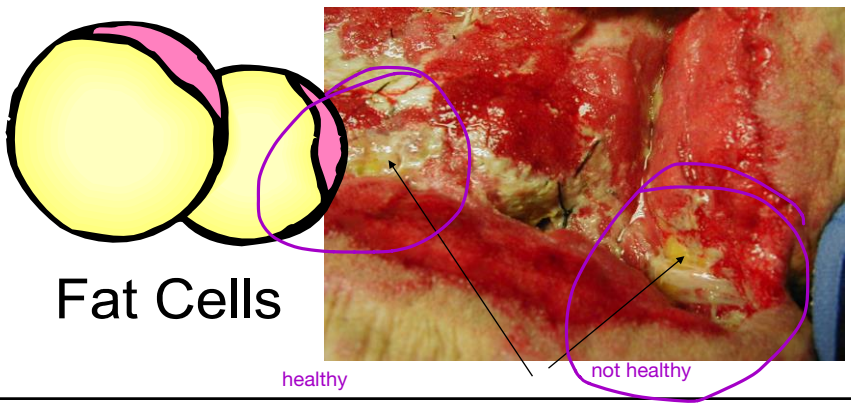
- Is tan in color
- Is hard to palpation with metal instrument
- Is covered with periosteum when healthy
- Becomes dark brown when necrotic
- Has to be debrided if necrotic



Tissue - *adipose*

- Is shiny, yellow globules when healthy
- Is shriveled and dry when devitalized
- Is poorly vascularized
- Is a frequent sources of abscess formation

slow to heal, quick to get infected
obese patients heal more slowly due to differences in vascularity

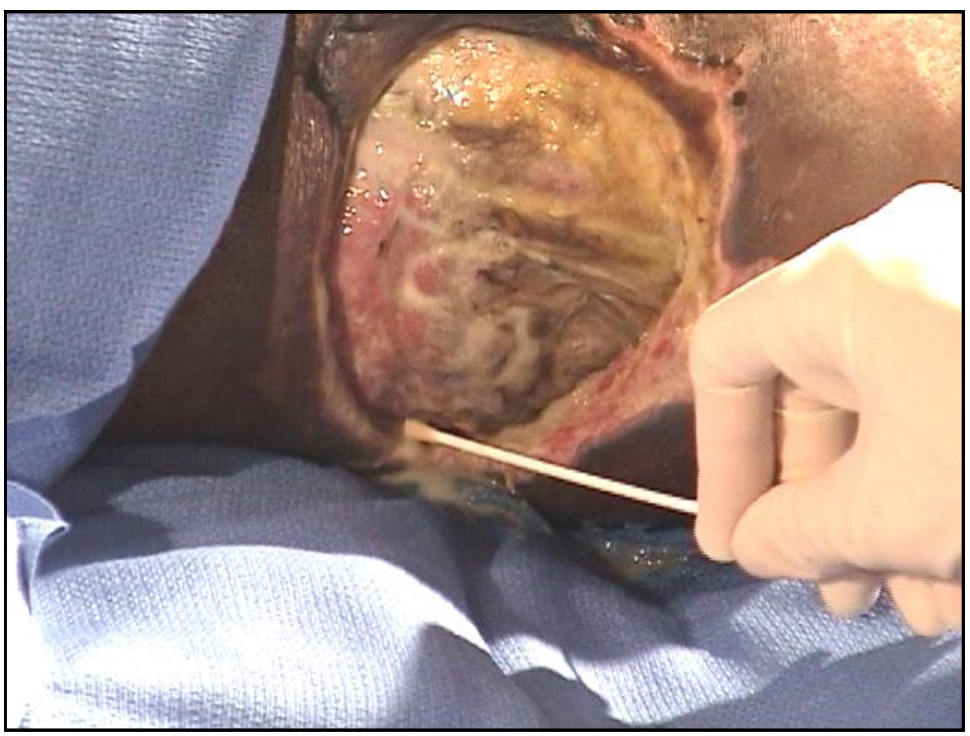


Drainage

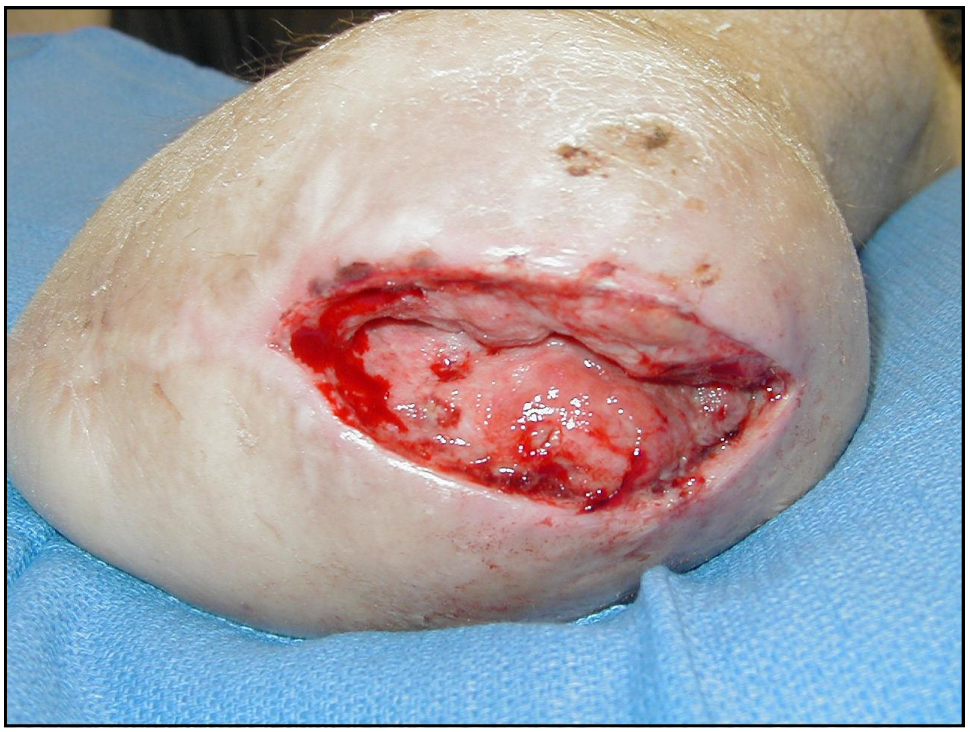
all drainage bad?

- Serous – clear, watery
- Sanguineous – red, bloody
- Serosanguineous – serous with pink tinge
- Exudate – pale yellow drainage, composed of dead cells, serum, and lysed debris; high protein content
- Seropurulence – slightly thicker yellow drainage indicative of colonized bacteria
- Purulence – thick necrotic drainage more odor
- Lymph – water and dissolved proteins (mostly albumin) too large to be absorbed by the capillaries

serous



exudate
puss, thick odorous



sanguineous

Skin color and texture

- Varies with wound type
- Indicates what is happening beneath the skin (wound extensions)
- Changes may indicates sign of infection
- Is helpful in determining when and what further tests are indicated
- May indicate an integument disease

thick white skin is dead. calloused or underlying infection

chronic venous insufficiency or chronic edema

Shingles or herpes zoster

send to ER.
rash/pain on dermatome.
sudden onset.

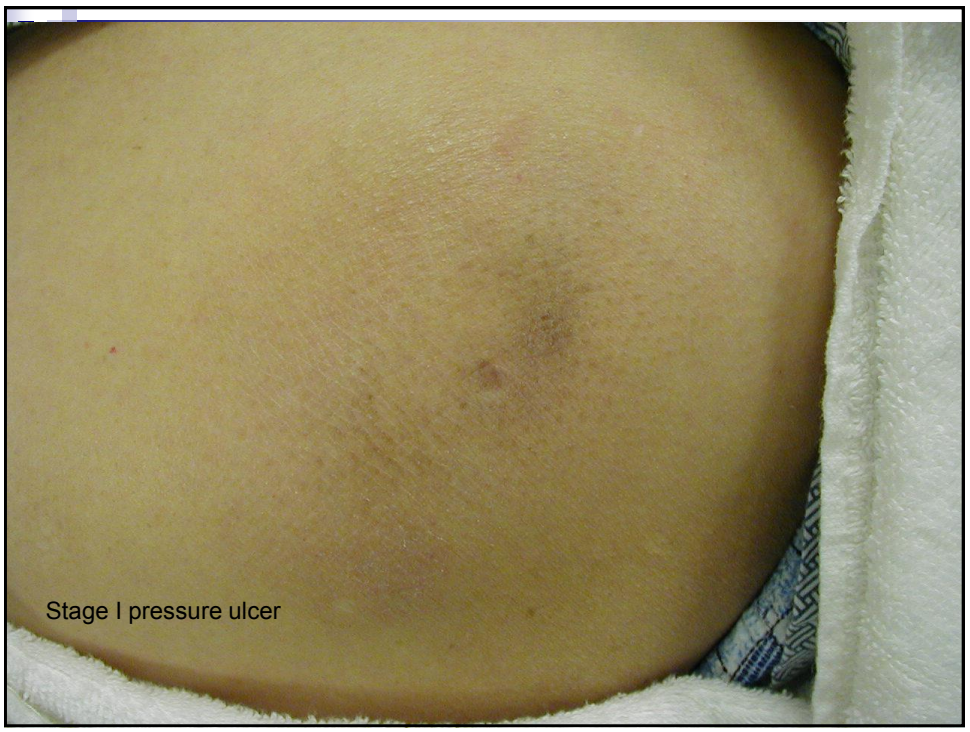
Vasculitis

Skin color - *erythema*

- Is ***abnormal*** red color
- May indicate underlying infection
- Indicative of Stage 1 pressure ulcer if over bony prominence
- May be a superficial or partial thickness burn

What is the patient history????

edema + redness
how long has it been since surgery? normal inflammatory if surgery was last 2-3 days. infection if surgery was weeks ago.


Stage I pressure ulcer


Infection

Skin color - *cyanosis*

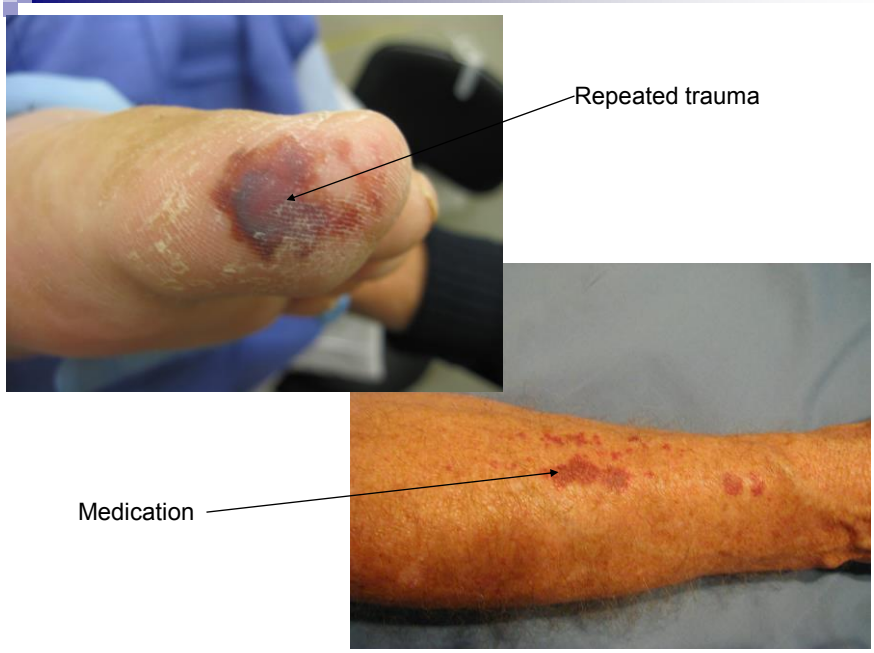
- Defined as dusky or bluish color
- Results from lack of oxygen to the tissue
- May be present in both arterial or venous wounds

What other signs are present????

Skin color – *deep tissue injury*

- Results from repeated shear forces on an insensate area
- Can occur on any area
- Can also result from medication, e.g. coumadin

What is the underlying cause???



1 hr

Skin color - *hemosiderin*

- Brownish-purple color
- Usually seen in gaiter area of the leg
- Results from extravasation of red blood cells into the intersitial tissue; the cell is lysed and hemoglobin released into the tissue
- Usually begins distally and migrates proximally
- Common in chronic venous insufficiency

Hemosiderin due to chronic edema

Skin color - *ecchymosis*

- Subdermal hemorrhage
- Usually result of acute injury

What is the patient history???

How long has it been present???

Was there any reported trauma???

Ecchymosis

Edema

- Defined as excess fluid in the interstitial tissue
- Can be multi-factorial in cause
- Impedes healing regardless of etiology
- Extent and type of edema helps identify wound etiology.

Edges

- Indicates the type of wound or the healing processes occurring within a wound bed

Edges – *even*

- Typical of arterial wounds
- Causes a punctate appearance to the wound

Edges - *irregular*

- Typical of venous wounds
- May occur as the wound epithelializes

Edges – *closed or rolling*

- Sign of a halted healing process
- Cells are termed senescent, meaning they are unable to reproduce
- The rolled edge is termed *epibole*.

signs that healing process has stopped

Edges - *hyperkeratosis*

- Overdevelop-ment of the outer layer of the skin
- Appears as thickened skin around the edge of a wound or as a callus

Edges - *epithelialization*

- Migration of epithelial cells over granulation tissue
- Include the percentage of edges that are epithelializating

Odor

- Types of distinctive odor
  - Pseudomonas – sweet, usually with greenish drainage
  - Putrid – usually indicates infection
  - Necrotic – accompanies extensive necrotic tissue
  - Musky – typical of malignant tissue

Pain

- Deep pain – cramping, indicative of ischemia or hypoxia; more comfortable in dependent position
- Throbbing, localized pain – indicative of infection. Deep pain that increases with pressure may be indicative of osteomyelitis.
- Superficial tenderness – exposed nerve endings, may be accompanied by sharp shooting pains
- Pain with stimulation of red tissue – living muscle!!!

Sensation

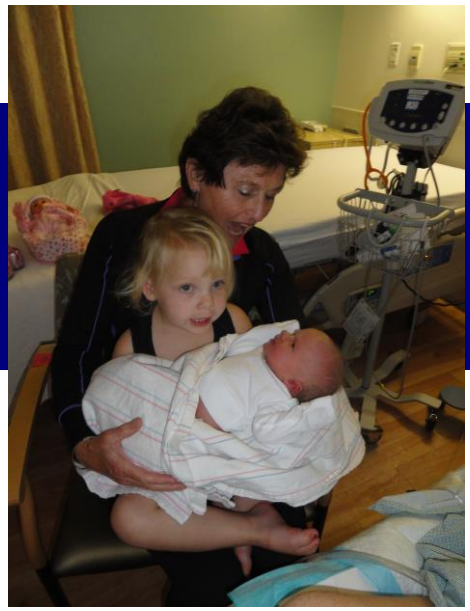
- Pressure – use Semmes-Weinstein monofilaments
  - Test on any patient with diabetes
- Temperature – use any warm and cool objects, hand, or infrared skin thermometer
  - Compare temperature to opposite body part or surrounding area of same body part
  - 3 degrees F difference is considered significant
  - Warmer indicates infection or inflammatory response; cooler indicates decreased blood flow

Now you are ready to make a diagnosis!!! What is the cause of the wound??? Why is it not healing???

Then you can make a care plan!!!

?????

Thank you!!!



BATES-JENSEN WOUND ASSESSMENT TOOL
Instructions for use

General Guidelines:

Fill out the attached rating sheet to assess a wound's status after reading the definitions and methods of assessment described below. Evaluate once a week and whenever a change occurs in the wound. Rate according to each item by picking the response that best describes the wound and entering that score in the item score column for the appropriate date. When you have rated the wound on all items, determine the total score by adding together the 13-item scores. The HIGHER the total score, the more severe the wound status. Plot total score on the Wound Status Continuum to determine progress.

Specific Instructions:

1. **Size**: Use ruler to measure the longest and widest aspect of the wound surface in centimeters; multiply length x width.

2. **Depth**: Pick the depth, thickness, most appropriate to the wound using these additional descriptions:
   - 1 = tissues damaged but no break in skin surface.
   - 2 = superficial, abrasion, blister or shallow crater. Even with, &/or elevated above skin surface (e.g., hyperplasia).
   - 3 = deep crater with or without undermining of adjacent tissue.
   - 4 = visualization of tissue layers not possible due to necrosis.
   - 5 = supporting structures include tendon, joint capsule.

3. **Edges**: Use this guide:

Indistinct, diffuse	=	unable to clearly distinguish wound outline.
Attached	=	even or flush with wound base, no sides or walls present; flat.
Not attached	=	sides or walls are present; floor or base of wound is deeper than edge.
Rolled under, thickened	=	soft to firm and flexible to touch.
Hyperkeratosis	=	callous-like tissue formation around wound & at edges.
Fibrotic, scarred	=	hard, rigid to touch.

4. **Undermining**: Assess by inserting a cotton tipped applicator under the wound edge; advance it as far as it will go without using undue force; raise the tip of the applicator so it may be seen or felt on the surface of the skin; mark the surface with a pen; measure the distance from the mark on the skin to the edge of the wound. Continue process around the wound. Then use a transparent metric measuring guide with concentric circles divided into 4 (25%) pie-shaped quadrants to help determine percent of wound involved.

5. **Necrotic Tissue Type**: Pick the type of necrotic tissue that is predominant in the wound according to color, consistency and adherence using this guide:

White/gray non-viable tissue	=	may appear prior to wound opening; skin surface is white or gray.
Non-adherent, yellow slough	=	thin, mucinous substance; scattered throughout wound bed; easily separated from wound tissue.
Loosely adherent, yellow slough	=	thick, stringy, clumps of debris; attached to wound tissue.
Adherent, soft, black eschar	=	soggy tissue; strongly attached to tissue in center or base of wound.
Firmly adherent, hard/black eschar	=	firm, crusty tissue; strongly attached to wound base and edges (like a hard scab).

6. **Necrotic Tissue Amount**: Use a transparent metric measuring guide with concentric circles divided into 4 (25%) pie-shaped quadrants to help determine percent of wound involved.

7. **Exudate Type**: Some dressings interact with wound drainage to produce a gel or trap liquid. Before assessing exudate type, gently cleanse wound with normal saline or water. Pick the exudate type that is predominant in the wound according to color and consistency, using this guide:

Bloody	=	thin, bright red
Serosanguineous	=	thin, watery pale red to pink
Serous	=	thin, watery, clear
Purulent	=	thin or thick, opaque tan to yellow
Foul purulent	=	thick, opaque yellow to green with offensive odor

8. **Exudate Amount**: Use a transparent metric measuring guide with concentric circles divided into 4 (25%) pie-shaped quadrants to determine percent of dressing involved with exudate. Use this guide:

None	=	wound tissues dry.
Scant	=	wound tissues moist; no measurable exudate.
Small	=	wound tissues wet; moisture evenly distributed in wound; drainage involves $\leq$ 25% dressing.
Moderate	=	wound tissues saturated; drainage may or may not be evenly distributed in wound; drainage involves > 25% to $\leq$ 75% dressing.
Large	=	wound tissues bathed in fluid; drainage freely expressed; may or may not be evenly distributed in wound; drainage involves > 75% of dressing.

9. **Skin Color Surrounding Wound**: Assess tissues within 4cm of wound edge. Dark-skinned persons show the colors "bright red" and "dark red" as a deepening of normal ethnic skin color or a purple hue. As healing occurs in dark-skinned persons, the new skin is pink and may never darken.

10. **Peripheral Tissue Edema & Induration**: Assess tissues within 4cm of wound edge. Non-pitting edema appears as skin that is shiny and taut. Identify pitting edema by firmly pressing a finger down into the tissues and waiting for 5 seconds, on release of pressure, tissues fail to resume previous position and an indentation appears. Induration is abnormal firmness of tissues with margins. Assess by gently pinching the tissues. Induration results in an inability to pinch the tissues. Use a transparent metric measuring guide to determine how far edema or induration extends beyond wound.

11. **Granulation Tissue**: Granulation tissue is the growth of small blood vessels and connective tissue to fill in full thickness wounds. Tissue is healthy when bright, beefy red, shiny and granular with a velvety appearance. Poor vascular supply appears as pale pink or blanched to dull, dusky red color.

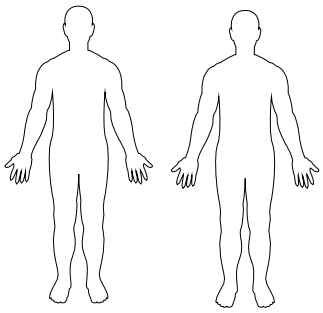
12. **Epithelialization**: Epithelialization is the process of epidermal resurfacing and appears as pink or red skin. In partial thickness wounds it can occur throughout the wound bed as well as from the wound edges. In full thickness wounds it occurs from the edges only. Use a transparent metric measuring guide with concentric circles divided into 4 (25%) pie-shaped quadrants to help determine percent of wound involved and to measure the distance the epithelial tissue extends into the wound.

BATES-JENSEN WOUND ASSESSMENT TOOL NAME

Complete the rating sheet to assess wound status. Evaluate each item by picking the response that best describes the wound and entering the score in the item score column for the appropriate date.

Location: Anatomic site. Circle, identify right **(R)** or left **(L)** and use **"X"** to mark site on body diagrams:

____ Sacrum & coccyx ____ Lateral ankle
____ Trochanter ____ Medial ankle
____ Ischial tuberosity ____ Heel Other Site



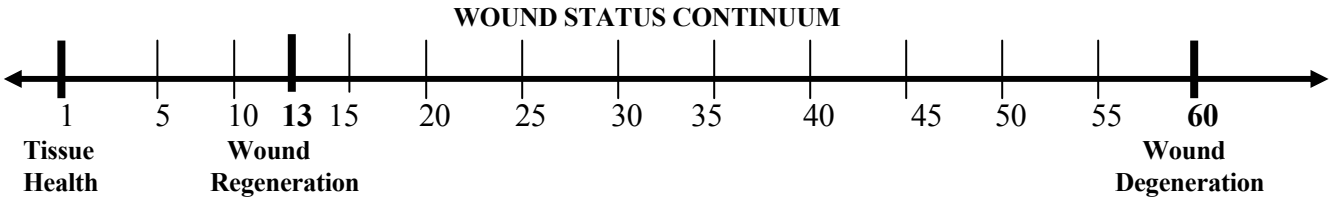
Shape: Overall wound pattern; assess by observing perimeter and depth.

Circle and date appropriate description:

____ Irregular ____ Linear or elongated
____ Round/oval ____ Bowl/boat
____ Square/rectangle ____ Butterfly Other Shape

Item	Assessment	Date Score	Date Score	Date Score
1. Size	1 = Length x width <4 sq cm 2 = Length x width 4--<16 sq cm 3 = Length x width 16.1--<36 sq cm 4 = Length x width 36.1--<80 sq cm 5 = Length x width >80 sq cm	5		
2. Depth	1 = Non-blanchable erythema on intact skin 2 = Partial thickness skin loss involving epidermis &/or dermis 3 = Full thickness skin loss involving damage or necrosis of subcutaneous tissue; may extend down to but not through underlying fascia; &/or mixed partial & full thickness &/or tissue layers obscured by granulation tissue 4 = Obscured by necrosis 5 = Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, bone or supporting structures	2 4		
3. Edges	1 = Indistinct, diffuse, none clearly visible 2 = Distinct, outline clearly visible, attached, even with wound base 3 = Well-defined, not attached to wound base 4 = Well-defined, not attached to base, rolled under, thickened 5 = Well-defined, fibrotic, scarred or hyperkeratotic	2		
4. Under-mining	1 = None present 2 =Undermining < 2 cm in any area 3 = Undermining 2-4 cm involving < 50% wound margins 4 = Undermining 2-4 cm involving > 50% wound margins 5 = Undermining > 4 cm or Tunneling in any area	1		
5. Necrotic Tissue Type	1 = None visible 2 = White/grey non-viable tissue &/or non-adherent yellow slough 3 = Loosely adherent yellow slough 4 = Adherent, soft, black eschar 5 = Firmly adherent, hard, black eschar	4		
6. Necrotic Tissue Amount	1 = None visible 2 = < 25% of wound bed covered 3 = 25% to 50% of wound covered 4 = > 50% and < 75% of wound covered 5 = 75% to 100% of wound covered	4		
7. Exudate Type	1 = None	1/ 3		

Item	Assessment	Date Score	Date Score	Date Score
	2 = Bloody 3 = Serosanguineous: thin, watery, pale red/pink 4 = Serous: thin, watery, clear 5 = Purulent: thin or thick, opaque, tan/yellow, with or without odor			
8. Exudate Amount	1 = None, dry wound 2 = Scant, wound moist but no observable exudate 3 = Small 4 = Moderate 5 = Large	1 2 on medial aspect		
9. Skin Color Sur-rounding Wound	1 = Pink or normal for ethnic group 2 = Bright red &/or blanches to touch 3 = White or grey pallor or hypopigmented 4 = Dark red or purple &/or non-blanchable 5 = Black or hyperpigmented	4		
10. Peripheral Tissue Edema	1 = No swelling or edema 2 = Non-pitting edema extends <4 cm around wound 3 = Non-pitting edema extends ≥4 cm around wound 4 = Pitting edema extends < 4 cm around wound 5 = Crepitus and/or pitting edema extends ≥4 cm around wound	2 4		
11. Peripheral Tissue Induration	1 = None present 2 = Induration, < 2 cm around wound 3 = Induration 2-4 cm extending < 50% around wound 4 = Induration 2-4 cm extending ≥ 50% around wound 5 = Induration > 4 cm in any area around wound	1		
12. Granu-lation Tissue	1 = Skin intact or partial thickness wound 2 = Bright, beefy red; 75% to 100% of wound filled &/or tissue overgrowth 3 = Bright, beefy red; < 75% & > 25% of wound filled 4 = Pink, &/or dull, dusky red &/or fills ≤ 25% of wound 5 = No granulation tissue present	5		
13. Epithe-lializa-tion	1 = 100% wound covered, surface intact 2 = 75% to <100% wound covered &/or epithelial tissue extends >0.5cm into wound bed 3 = 50% to <75% wound covered &/or epithelial tissue extends to <0.5cm into wound bed 4 = 25% to < 50% wound covered 5 = < 25% wound covered	2 4		
	TOTAL SCORE			
	SIGNATURE			



Plot the total score on the Wound Status Continuum by putting an **"X"** on the line and the date beneath the line. Plot multiple scores with their dates to see-at-a-glance regeneration or degeneration of the wound.